Appl. No. : **10/713,899**
Filed : **September 12, 2003**

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(Previously presented)** An energy conversion system operative to form an energetic fluid comprising thermal diluent fluid, combustion gases, oxygen containing fluid, and pollutants, comprising:

a combustor configured to combust oxygen and fuel to form a combusting fluid, the combustor including one or more fluid inlets configured to receive oxygen containing fluid, fuel, and a thermal diluent fluid, and a fluid outlet configured to emit the energetic fluid;

a fluid delivery system configured to deliver the oxygen containing fluid, the fuel, and the thermal diluent fluid to one or more inlets of the combustor, the oxygen containing fluid being at an elevated pressure; and

a controller configured to control the delivery of fluid within the energy conversion system so that at least one pollutant content within the energetic fluid is below a desired concentration near the combustor outlet port, and to control a temperature of the fluid.

2. (New) A process of generating power using an apparatus comprising a combustion chamber and a work engine coupled to the combustion chamber, comprising the steps of:

delivering fuel to the combustion chamber;

delivering compressed air at an elevated temperature and a pressure to the combustion chamber;

varying the quantity of air and fuel supplied to the combustion chamber, while maintaining a constant fuel to air ratio;

mixing the fuel and air in the combustion chamber;

igniting the mixture of fuel and air to produce a combustion vapor stream;

delivering water under pressure to the combustion chamber, the water being converted substantially instantaneously upon entering the combustion chamber to steam, the delivery and formation of steam creating turbulence and mixing in the combustion chamber resulting in a working fluid comprised of steam, combustion products and non-flammable materials in the air and fuel;

controlling the quantity of water delivered to the combustion chamber such that the latent heat of vaporization of the water maintains the temperature of the working fluid at a desired level;

delivering the working fluid to the work engine; and

transferring heat from the working fluid exiting the work engine to the water, the heat transferred to the water being sufficient to elevate the temperature of the water from a feed temperature to the desired temperature for delivery to the combustion chamber.

3. (New) An apparatus for mixing a first fluid with a second fluid, the apparatus comprising: a fluid distribution portion comprising at least one tubular portion having an outer surface and an inner surface, the inner surface defining a first flow path for the first fluid, a duct that defines a second flow path for the second fluid, the duct having an axial direction and a first and second transverse directions mutually distinct from the axial direction, the first and second transverse directions defining a plane through an axial location and containing a cross-sectional area of the duct, a first fluid delivery system for supplying the first fluid to the fluid distribution portion a second fluid delivery system for supplying the second fluid to the duct; the tubular portion comprising a plurality of orifices each forming a third flow path along which the first fluid can be injected into the second fluid within the duct; and wherein the outer surface of the tubular portion comprising the orifices is positioned within the duct in the second flow path and the orifices when projected onto a plane containing the first and second transverse directions have an average spatial density of at least about 10,000 orifices per square meter of duct cross sectional area.

4. (New) The apparatus of Claim 3, wherein the orifices have an average lineal density of at least 1000 orifices per meter length of the tubular portion.

5. (New) The apparatus of Claim 3, wherein the orifices when projected onto a plane containing the first and second transverse directions have an average spatial density of at least about 1 00,000 orifices per square meter of duct transverse cross sectional area.

6. (New) The apparatus of Claim 3, wherein the orifices have an average diameter less than about 80 micrometers.

7. (New) The apparatus of Claim 3 wherein the orifices have an average diameter less than about 5 micrometers.

8. (New) The apparatus of Claim 3, further comprising a flexible manifold for connecting the first fluid supply system to each tubular portion.

9. (New) The apparatus of Claim 3, further comprising a support that is coupled to the distribution portion to support the distribution portion in the duct.

10. (New) The apparatus of Claim 3, wherein the tubular portion comprises a plurality of tubular curvilinear sections extending in at least one of the transverse directions, whose flow paths are connected to at least one manifold that is connected to the first fluid supply system.

11. (New) The apparatus of Claim 3, wherein the curvilinear sections are positioned sequentially downstream within the second flow path from each other.

12. (New) The apparatus of Claim 3, wherein the tubular portion comprises at least one tubular member that extends in the axial direction and at least one manifold which connects the tubular member to the first fluid supply system.

13. (New) The apparatus of Claim 3, wherein the tubular portion comprises at least one tubular member that extends in the first or second transverse direction, and are connected to at least one pair of manifolds at angles between 5 degrees and 175 degrees.

14. (New) The apparatus of Claim 13, wherein the manifolds are angled with respect to each other.

15. (New) The apparatus of Claim 13, wherein a differential pressure is applied to the first fluid between the two manifolds.

16. (New) The apparatus of Claim 1, wherein the tubular portion includes a first portion that extends in the first transverse direction and at least the size of the orifices or the distribution of the orifices in the first transverse direction are configured so as to deliver a non-uniform amount of the first fluid with respect to the first transverse direction to the second fluid to achieve a desired transverse distribution of the first fluid in the second fluid.

17. (New) The apparatus of Claim 16, wherein the tubular portion includes a second portion that extends in the second transverse direction and at least the size of the orifices or the distribution of the orifices in the second transverse direction are configured so as to deliver a non-uniform amount of the first fluid with respect to the second transverse direction to the second fluid to achieve a desired transverse distribution of the first fluid in the second fluid in the second transverse direction.

18. (New) The apparatus of Claim 16, wherein the first and second transverse directions are perpendicular to each other.

19. (New) The apparatus of Claim 16, wherein the first transverse direction is radial to the axial direction.